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EXAMINER

HUNG, YUBIN

ART UNIT PAPER NUMBER

2625

DATE MAILED: 07/23/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

09/924,202

Applicant(s)

KEITHLEY, DOUGLAS G.

Examiner

Yubin Hung

Art Unit

2625

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-7, 11-14, 17 and 18 is/are rejected.
- 7) ☒ Claim(s) 8-10, 15, 16, 19 and 20 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on Aug. 07, 2001 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

## Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

## Attachment(s)

- ☒ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date 2.
- ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date \_\_\_\_.
- ☐ Notice of Informal Patent Application (PTO-152)
- ☐ Other: \_\_\_\_.

## DETAILED ACTION

### *Drawings*

1. The drawings are objected to because the descriptive text labels in blocks 405-409 of Fig. 4 are misleading. Specifically,

- In block 405, the text should have been "Discard pixels with  $L < L_b$ "
- In block 407, the text should have been "Discard pixels with negative b value"
- In block 409, the text should have "of the remaining pixels" appended to the end

Corrected drawing sheets are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of

any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

### ***Specification***

2. The disclosure is objected to because of the following informalities:
  - P.11, Paragraph 0035: The statement implies that the image contains both a foreground and a background. (See line 3.) This being the case, the color adjustment, being applied to "each pixels of all the original data" (line 2), will make uniform color of the *entire* image, not just the background

Appropriate correction is required.

### ***Claim Objections***

3. Claim 15 is objected to because of the following informalities:
  - Line 7: "b color coordinate" should be changed to "b-value coordinate" to be consistent with the usage in the rest of the claim

Appropriate correction is required.

***Claim Rejections - 35 USC § 112***

4. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

5. Claims 12, 14-16, 18-20 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

6. Claim 12 recites the limitation "said image," both in line 4. There is insufficient antecedent basis for this limitation in the claim.

(Note: For examination purpose, "said image" will be interpreted as "said document.")

7. Claims 14 and 18 recite the limitation "original sepia tones of said sepia tone image" in line 6 and line 7, respectively. There is insufficient antecedent basis for this limitation in the claim. Claims 15-16 (respectively, 19-20), being dependent upon claim 14 (respectively, 18), are similarly rejected.

(Note: For examination purpose, "original sepia tones of said sepia tone image" will be interpreted as "the original tones of the image of said document.")

8. Claims 15 and 19 recite the limitation "said sepia tone image," both in line 3.

There is insufficient antecedent basis for this limitation in the claim. Claims 16 and 20, being dependent upon claims 15 and 19 respectively, are similarly rejected.

### ***Claim Rejections - 35 USC § 103***

9. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

10. Claims 1, 11, 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Murakami et al. (US 4,967,276) and Deng et al. (US 6,580,824).

11. Regarding claim 1, Murakami discloses

- scanning said image with visible light and infrared light  
[Fig. 6, numerals 1, 2]
- using data associated with infrared light reflected from the image and data associated with visible light reflected from the image, creating adjusted data  
[Fig. 6, numerals 5, 120, 160; Col. 7, lines 14-18]
- outputting a reproduction image using said adjusted data  
[Fig. 6, numeral 7]

Murakami does not expressly disclose that the said image is a sepia tone image.

However, Deng discloses a method and system for classifying sepia-tone images. [See abstract.]

Murakami and Deng are combinable because they both have aspects that are from the same field of endeavor of image processing.

At the time of invention, it would have been obvious to a person of ordinary skill in the art to modify Murakami by including sepia-tone images as its input. The motivation for doing so would have been to develop a versatile method that can accept as many kinds of input images as possible.

Therefore, it would have been obvious to combine Deng with Murakami to obtain the invention as described in claim 1.

12. Regarding claim 11, and similarly claim 17, Murakami further discloses

- illuminating means for scanning a document with visible light and infrared radiation  
[Fig. 6, numerals 1, 2, 14, 21, 22, 23; Col. 5, lines 34-36; Col. 6, lines 1-7]
- means for receiving data representative of reflected visible light and data representative of reflected infrared radiation  
[Fig. 6, numerals 10, 11]
- means for adjusting said data representative of reflected visible light using said data representative of reflected infrared radiation  
[Fig. 6, numerals 5, 120, 160; Col. 7, lines 14-18]

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13. Claims 2 –3 are rejected under 35 U.S.C. 103(a) as being unpatentable over Murakami et al. (US 4,967,276) and Deng et al. (US 6,580,824) as applied to claims 1, 11, 17 above, further in view of Demos (US Pub No. 2003/0112863 A1).

14. Regarding claim 2, Murakami and Deng discloses all limitations in its parent, claim 1. In addition, Deng further discloses

- obtaining tristimulus color space coordinates for pixels of the sepia tone image in a first coordinate system [Fig. 3, numerals 310-320; Col. 4, line 61 - Col. 5, line 5. Note that RGB is the first system]
- converting the first coordinate system to a second coordinate system [Fig. 3, numeral 320; Col. 4, line 61 - Col. 5, line 5. Note that HSV is the second system]
- factoring data values associated with said second system based on data values associated with said first coordinate system [Fig. 3, numeral 340; Col. 4, line 61 - Col. 5, line 5. Note that in 340 it is inherent that the pixels have been factored based on saturation and intensity values first. Note further that the data values of the second system are associated with those of the first system through the conversion operation]

Murakami and Deng do not expressly disclose that infrared radiation data is used to modify a single coordinate.

However, in [Fig. 4, numeral 401; P. 5, lines 4-6 of paragraph 0098 & lines 1-5 of paragraph 0107] Demos teaches/suggests using non-visible wavelength (e.g., infrared) signal to modify the luminance.

Murakami, Deng and Demos are combinable because they both have aspects that are from the same field of endeavor of image processing.



At the time of invention, it would have been obvious to a person of ordinary skill in the art to modify Murakami and Deng with the teachings of Demos by using non-visible wavelength (e.g., infrared) signal to modify the luminance. The motivation for doing so would have been to improve the dynamic range and resolution in the luminance channel, as pointed out by Demos in lines 1-5 of paragraph 0107.

Therefore, it would have been obvious to combine Demos with Murakami and Deng to obtain the invention as described in claim 2.

15. Regarding claim 3, Deng further discloses

- said obtaining tristimulus color space coordinates for pixels of the sepia tone image associated with a first coordinate system comprises: using red, green, blue color space coordinates  
[Fig. 3, numeral 320; Col. 4, line 61 - Col. 5, line 5]

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16. Claims 4-7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Murakami et al. (US 4,967,276), Deng et al. (US 6,580,824) and Demos (US Pub No. 2003/0112863 A1) as applied to claims 2-3 above, further in view of Maeda (US 5,995,665).

17. Regarding claim 4, the combined invention of Murakami, Deng and Demos (MDD) discloses all limitations in its parent, claim 3.

MDD does not expressly disclose

- the second color coordinate system is  $L^*a^*b^*$ , where L = luminance value, a=red-yellow value, and b=green-blue value

However, in [Fig. 28, numeral 502; Col. 29, lines 16-21] Maeda teaches/suggests using  $L^*a^*b^*$  as the second system. (Note that it is well known in the art that L, a, and b of  $L^*a^*b^*$  are defined as above. For example, see [Dillinger et al. (US 5,870,077): Col. 1, lines 44-46].)

MDD and Maeda are combinable because they both have aspects that are from the same field of endeavor of image processing.

At the time of invention, it would have been obvious to a person of ordinary skill in the art to modify MDD with the teachings of Maeda by using  $L^*a^*b^*$  as the second system. The motivation for doing so would have been because the distance between two points in  $L^*a^*b^*$  space matches the perceived difference of the colors represented by these two points.

Therefore, it would have been obvious to combine Maeda with MDD to obtain the invention as described in claim 4.

18. Regarding claim 5, Maeda further discloses

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- transforming all RGB space coordinates to L\*a\*b\* space coordinates [Fig. 28, numeral 502; Col. 29, lines 16-21]

19. Regarding claim 6, Maeda further discloses

- determining a benchmark value of "L" associated with said sepia tone a image [Fig. 7, numerals 24, 122; Fig. 28, numeral 506; Col. 10, lines 30-32; Col. 31, lines 17-28. Note that the background candidate b is a luminance value and is considered the benchmark value]

20. Regarding claim 7, Deng further discloses

- discarding all pixels where 'L' is less than said benchmark value [Fig. 3, numeral 340; Col. 4, line 67 - Col. 5, line 3. Note that the intensity value (V) describes luminance, so does L]

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21. Claim 12 is rejected under 35 U.S.C. 103(a) as being unpatentable over Murakami et al. (US 4,967,276) and Deng et al. (US 6,580,824) as applied to claims 1, 11, 17 above, further in view of Nakai et al. (US 6,094,281).

22. Regarding claim 12, the combined invention of Murakami and Deng discloses all limitations in its parent, claim 11.

The combined invention of Murakami and Deng does not expressly disclose

- if said apparatus is a reduction optic scanner, said illuminating means including means for selectively filtering said infrared radiation from being scanned across said image

However, in [Fig. 29, numerals 1201, 1205; Fig. 31, numerals 1323, 1324; Col. 17, lines 8-14 and 53-58] Nakai teaches/suggests using a reduction optic scanner with an infrared filter. Note that the IR filter (1323), being mounted on a rotary shaft (1324), clearly is mobile, i.e., its employment for filtering is selective.

The combined invention of Murakami and Deng is combinable with Nakai because they both have aspects that are from the same field of endeavor of image acquisition.

At the time of invention, it would have been obvious to a person of ordinary skill in the art to modify the combined invention of Murakami and Deng with the teachings of Nakai by using selective filtering of IR radiation. The motivation for doing so would have been to allow the reading of an original image in both the visible light region and the infrared region, as pointed out by Nakai in [Col. 3, lines 19-34].

Therefore, it would have been obvious to combine Nakai with Murakami and Deng to obtain the invention as described in claim 12.

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23. Claim 13 is rejected under 35 U.S.C. 103(a) as being unpatentable over Murakami et al. (US 4,967,276) and Deng et al. (US 6,580,824) as applied to claims 1, 11, 17 above, further in view of Tanaka et al. (US 6,501,865).

24. Regarding claim 13, the combined invention of Murakami and Deng discloses all limitations in its parent, claim 11.

The combined invention of Murakami and Deng does not expressly disclose

- if said apparatus is a contact image scanner, said illuminating means including an infrared emitter

However, in [Fig. 11; Col. 6, lines 34-37] Tanaka teaches/suggests using an illuminating means with an infrared emitter.

The combined invention of Murakami and Deng is combinable with Tanaka because they both have aspects that are from the same field of endeavor of image acquisition.

At the time of invention, it would have been obvious to a person of ordinary skill in the art to modify the combined invention of Murakami and Deng with the teachings of Tanaka by using an illuminating means with an infrared emitter. The motivation for doing so would have been because of its low power consumption and higher reflectivity, as pointed out by Tanaka in [Col. 6, lines 38-43].

Therefore, it would have been obvious to combine Tanaka with Murakami and Deng to obtain the invention as described in claim 13.

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25. Claim 14 (as interpreted) is rejected under 35 U.S.C. 103(a) as being unpatentable over Murakami et al. (US 4,967,276) and Deng et al. (US 6,580,824) as applied to claims 1, 11, 17 above, further in view of Maeda (US 5,995,665) and Shimura et al. (US 6,486,981).

26. Regarding claim 14, the combined invention of Murakami and Deng discloses all limitations in its parent, claim 11.

The combined invention of Murakami and Deng does not expressly disclose

- means for converting RGB color coordinate data to L\*a\*b\* color coordinate data
- means for determining an image background level Lb value
- means for replacing the L\*a\*b\* color coordinate data with coordinate data representative of original sepia tones of said sepia tone image

However, Maeda teaches/suggests converting RGB to L\*a\*b\* [Fig. 28, numeral 502; Col. 29, lines 16-21] as well as determining the image background luminance density level [Fig. 7, numeral 24; Fig. 28, numeral 506; Col. 10, lines 30-32; Col. 31, lines 17-28]. Further, Shimura teaches/suggests replacing color coordinate data with data representative of original tones [Fig. 7, numerals 92, 93; Col. 9, line 66 – Col. 10, line 8. Note that the average values are considered as the representative data. Note further that while the color coordinates here used are YCrCb, Maeda teaches using L\*a\*b\*, as shown above].

The combined invention of Murakami and Deng is combinable with Maeda and Shimura because they both have aspects that are from the same field of endeavor of image processing.

At the time of invention, it would have been obvious to a person of ordinary skill in the art to modify the combined invention of Murakami and Deng with the teachings of Maeda and Shimura by converting RGB to  $L^*a^*b^*$ , determining the image background luminance density level and replacing color coordinate data with data representative of original tones. The motivation for doing so would have been to use a color space that better matches the perceived color difference, to be able to obtain better image processing (e.g., binarization, see [Maeda, Col. 3, lines 4-15]), and to improve image compression ration [Shimura, Col. 10, lines 5-7. Note that a block containing data of the same value can achieve the highest compression efficiency].

Therefore, it would have been obvious to combine Maeda and Shimura with Murakami and Deng to obtain the invention as described in claim 14.

***Allowable Subject Matter***

27. Claims 8-10 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

28. Claims 15, 16, 19, 20 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims as well as to overcome the rejection(s) under 35 U.S.C. 112, second paragraph, set forth in this Office action.

29. The following is a statement of reasons for the indication of allowable subject matter.

30. Regarding claim 8, and similarly its dependent claims 9 and 10, the prior art of record fails to teach or suggest, alone or in combination, a method for reproducing a sepia tone image comprising, along with other limitations:

- Discarding all pixels wherein 'b' is negative

The closest art of record, Deng et al. (US 6,580,824) discloses discarding pixels with a saturation value less than a threshold [Fig. 3, numeral 340; Col. 4, line 67 – Col. 5, line 3]. However, it does not teach discarding pixels based on their 'b' value nor using zero



as the threshold value. In addition, Cheng et al. (US 6,040,905) discloses counting the number of pixels with a  $b^*$  value greater than a threshold in the process of computing a fiber color grade [Col. 10, lines 40-50]. While the pixels with a  $b^*$  value less than the threshold is not included (i.e., discarded), the value of the threshold has not been expressly specified, although it is obviously greater than zero, since it is the measurement of "yellowness" (i.e.,  $b^* > 0$ ) that is of interest.

31. Regarding claim 15, and similarly claim 19 and their respective dependents claims 16 and 20, the prior art of record fails to teach or suggest, alone or in combination, a sepia tone scanner comprising, along with other limitations:

- means for replacing L coordinates of said  $L^*a^*b^*$  color coordinate data with received said data representative of reflected infrared radiation

The closest art of record, Murakami et al. (US 4,967,276) discloses adjusting visible light data using infrared data [Fig. 6, numerals 5, 120, 160, 170; Col. 7, lines 14-18]. However, it does not teach replacing L (luminance) coordinates with infrared data.

### ***Contact Information***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Yubin Hung whose telephone number is (703) 305-1896. The examiner can normally be reached on 7:30 - 4:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Bhavesh Mehta can be reached on (703) 308-5246. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Yubin Hung  
Patent Examiner  
July 14, 2004



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